following will show. The natives have a superstitious fear of the creature, believing that it possesses some supernatural power by which it can destroy those who seek to capture it, or do it harm. The consequence of this is that it is with the greatest difficulty one can obtain a specimen. With most of the people no amount of money would be a sufficient inducement to go in pursuit of the creature, "because," say they, "we value our lives more than money." It is only a few of the more daring spirits among them who, knowing the *òdiny, i.e.* the secret by which they can disarm it of its dreaded power, have the courage to attempt its capture. Occasionally it is brought to Tamatave for sale, where it realises a good sum. Now and then it is accidentally caught in the traps which the natives set for lemurs, but the owner of the trap, unless one of those versed in the Aye-aye mysteries, who knows the charm by which to counteract its evil power, smears fat over it, thus securing its forgiveness and goodwill, and then sets it free. The story goes that occasionally, when a person sleeps in the forest, the Aye-aye brings a pillow for him—if a pillow for the head, the person will become rich; if for the feet, he will shortly succumb to the creature's fatal power, or at least will become bewitched. Such is the account which the natives give of the curious *Cheiromys Madagascariensis*.

R. BARON,
L.M.S. Missionary

Antananarivo, Madagascar, April, 1882

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

(FROM A CORRESPONDENT)

THIS body held its thirty-first annual meeting at Montreal during the week beginning August 23. under the presidency of Dr. J. W. Dawson, LL.D., F.R.S. Ample accommodation for the Association was found in the buildings of McGill University, and the attendance was very large, 939 persons having been registered. Besides the American and Canadian Fellows and Members of the Association, there were several guests from abroad, among them, Dr. W. B. Carpenter, Dr. J. H. Gilbert, Prof. Wiltshire, and Dr. Phené, of London; Dr. Samuel Haughton and Prof. Fitzgerald from Dublin, together with Messrs. Szabo of Budapest, Kowalesky of Moscow, and König of Paris, all of whom made communications to the Association.

After the opening ceremonies on the morning of the first day, the nine sections into which the Association is now divided listened to the addresses of their respective vice-presidents. These sections are as follows:—A. Mathematics and Astronomy; B. Physics; C. Chemistry; D. Mechanical Science; E. Geology and Geography; F. Biology; G. Histology and Microscopy; H. Anthropology; and I. Economic Science and Statistics. According to custom, the retiring president of the Association, Dr. George J. Brush, gave his address on the first Wednesday evening, taking for his theme, The Progress of American Mineralogy. This was followed by a reception of the Members of the Association by the Local Committee, its chairman, Dr. Sterry Hunt, acting as host. On Thursday evening the New Redpath Museum of Natural History, lately erected at a cost of 100,000 dollars by Mr. Peter Redpath, and by him presented to the University, was formally opened with addresses by Mr. James Hall and Dr. W. B. Carpenter, a reception being given therein by the President and Mrs. Dawson to the Association and others. Thursday and Friday were devoted to the work of the sections, but Saturday was given to excursions to Ottawa and to Quebec, in both of which cities entertainments were provided by the citizens. Public lectures were given on Monday and Tuesday evenings by Dr. W. B. Carpenter and Prof. Meville Bell, on The Temperature of the Deep Sea, and On Visible Speech. The reading of papers, however, occupied both the morning and afternoon of these days, and of Wednesday the 30th, on the evening of which day the closing meeting was held, the Association adjourning to meet next August at Minneapolis, in Minnesota, under the presidency of Dr. C. A. Young, of Princeton, New Jersey. The number of papers entered was 256, of which nearly all were read either at length or in abstract, and will be published in the Proceedings.

In addition to the excursions already noticed was one provided by the Harbour Commissioners, and another through South-eastern Canada, to Lake Memphramagog at the close of the meeting. An entertainment in the galleries of the Montreal Fine Art Association should also be mentioned, and various garden parties and *fêtes* by the citizens, who vied with each other and with the railways and steamboat lines in their hospitalities to the members of the Association.

Mention should here be made of a Handbook of Montreal, an illustrated volume of 159 pages, prepared for the meeting by Mr. S. E. Dawson, of the Local Committee, and presented to the members. This little book is remarkable for its excellent historical introduction, and also for a valuable coloured geological map of the environs of the city, prepared by Dr. Sterry Hunt.

After the meeting a small party, including Dr. Carpenter, Prof. Wiltshire, and Dr. Szabó, were conducted by Dr. J. W. Dawson and Dr. Sterry Hunt to the remarkable locality of *Eozöon Canadense*, near St. André Avellin, among the Laurentide Hills, not far from the City of Ottawa.

PROFESSOR PLANTAMOUR

THE daily journals notify the decease on the 7th instant, at Geneva, of Prof. Plantamour, for many years Director of the Observatory and Professor of Astronomy in the University of that city.

Emile Plantamour was born at Geneva in 1815, and received his early education in the old college founded by Calvin. He entered the Geneva Academy in 1833, where he became a pupil of Alfred Gautier, then in the Chair of Astronomy, and on graduating, adopted this science as his profession. He studied two years at Paris under Arago, and subsequently proceeded to Königsberg, where he became a pupil of the illustrious Bessel. His inaugural dissertation was upon the methods of calculating the orbits of comets, and he obtained the degree of Doctor in 1839. He subsequently visited Berlin where Encke was then one of the great masters of astronomical science of the day. On returning to Geneva he was appointed Professor of Astronomy and Director of the Observatory; these positions he continued to occupy nearly up to the time of his decease. The observations made under his direction were published in various parts, commencing in 1843, and related to astronomy, magnetism, and meteorology. He took part in a number of geodetical operations in Switzerland, and was the representative of Geneva on the Swiss Geodesic Commission.

Plantamour was a man of considerable private means, and hence was independent of the very modest salary attaching to his official position. A few years since he presented a 10-inch refractor to the Observatory of Geneva, and a building suitable for it was erected at his expense. This instrument has already done good work in the hands of Dr. Meyer. Plantamour devoted much attention to cometary astronomy, one of his most elaborate investigations being his determination of definitive elements of Mauvais' comet of 1844, which was observed from July 7 in that year, to the middle of March, 1845, and therefore offered a favourable opportunity for the calculation of the true form of orbit. Plantamour's result was a somewhat notable one: after taking into account the effect of the attraction of the planets during the

comet's visibility, he concluded that at the passage through perihelion in October, 1844, the comet was moving in an elliptical orbit with a period of revolution of 102050 ± 3090 years. In 1846 he made extensive calculations bearing upon the motion of the two heads of Biela's comet, the results of which will be found in No. 584 of the *Astronomische Nachrichten*. He further discussed the elements of what was called at the time "Galle's second comet," 1840 II. (*Astron. Nach.*, No. 475-6). In this paper he pointed out some anomalies in the intensity of the comet's light, similar to what has been observed from time to time in other comets.

Plantamour was placed on the list of Associates of the Royal Astronomical Society in 1844; he was a corresponding member of the Academy of Sciences of the Institute of France, and honorary member of the Academy of Turin. Few of those colleagues who were at work at the commencement of his astronomical life now remain.

ON SIR WILLIAM THOMSON'S GRADED GALVANOMETERS

TWENTY years ago the experimental sciences of electricity and magnetism were in great measure mere collections of qualitative results, and, in a less degree, of results quantatively estimated by means of units which were altogether arbitrary. These units, depending as they did on constants of instruments and conditions of experimenting which could never be made fully known to the scientific public, were a source of much perplexity and labour to every investigator, and to a great extent prevented the results which they expressed from bearing fruit to the furtherance of scientific progress. Now happily all this has been changed. The absolute system of units introduced by Gauss and Weber and rendered a practical reality in this country by the labours of the British Association Committee on Electrical Standards has changed experimental electricity and magnetism into sciences of which the very essence is the most delicate and exact measurement, and enables their results to be expressed in units which are altogether independent of the instruments, the surroundings, and the locality of the investigator.

The record of the determinations of units made by members of the Committee, for the most part by methods and instruments which they themselves invented, forms one of the most interesting and instructive books in the literature of electricity, and when the history of electrical discovery is written the story of their work will form one of its most important chapters. But besides placing on a sure foundation the system of absolute units, they conferred a hardly less important benefit on electricians by giving them a convenient nomenclature for electrical quantities. The great utility of the practical units and nomenclature, which the Committee recommended, soon became manifest to every one who had to perform electrical measurements, and has led within the last year to their adoption, with only slight alterations, by nearly all civilised nations. Although it is not yet quite twelve months since the late Congress of Electricians at Paris concluded its sittings, the recommendations which it issued have been widely adopted and appreciated by those engaged in electrical work, and have thus begun to yield excellent fruit by rendering immediately available for comparison and as a basis for further research the results of experimenters in all parts of the world. Soon even the ordinary workmen in charge of dynamo machines or employed in electrical laboratories will be able to tell the number of volts and amperes which a generator can give at a certain speed and under certain conditions, to determine the number of amperes of current required to light an incandescence lamp to its full brilliancy, or to measure the capacity of a secondary cell in coulombs per square centimetre.

But in order that the full benefit of the conclusions of the Paris Congress may be obtained it is essential in the first place that convenient instruments should be used, adapted to give directly, or by an easy reduction from their indications the number of amperes of current flowing in a particular circuit, and the number of volts of difference of potentials between any two points in that circuit. To be generally useful in practice these instruments should be easily portable, and should have a very large range of sensibility; so that, for example, the instrument, which suffices to measure the full potential produced by a large Siemens or Edison machine, may be also available for testing, if need be, the resistances of the various parts of the armature and magnets by the only satisfactory method; namely by comparing by means of a galvanometer of high resistance the difference of potential between the two ends of the unknown resistance with that between the ends of a known resistance joined up in the same electrical circuit. In like manner the ampere measurer should be one that could be introduced without sensible disturbance into a circuit of low resistance to measure either a small fraction of an ampere, or the whole current flowing through a circuit containing a large number of electric lamps. These conditions are fulfilled by two instruments recently invented and patented by Sir William Thomson and called by him Graded Galvanometers. To give a short account of these instruments is the object of the present article.

I. The Potential Galvanometer.

The galvanometer used for measuring differences of potential in electrical circuits is shown in Fig. 1 which is engraved from a photograph of the actual instrument. It consists of two essential parts, a coil and a magnetometer. The coil is made of silk covered copper or German silver wire of No. 32 B.W.G. When made of German silver wire it contains about 2,200 yards of wire wound in 7,000 turns, and has a resistance of over 6,000 ohms. It is made in the form of an anchor ring having an outside diameter of fourteen centimetres and an inside diameter of six centimetres. The diameter of section is thus four centimetres. The coil is wound within a mould of proper shape and dimensions, and is then impregnated with melted paraffin under the receiver of an air-pump. A solid compact ring is thus obtained, which does not require a wooden case; and which served round with a covering of silk ribbon looks well and is not at all liable to get out of order. The coil thus constructed is attached to one end of the horizontal wooden platform P shown in the drawing, and kept firmly in its place by a pair of wooden clamps fitted to the lower half of the coil, and screwed firmly to the end of the platform. When in position the plane of the coil is vertical, and at right angles to a V groove that runs along the middle of the platform. The centre of the coil is opposite to and about one and a half centimetres above the bottom of this groove.

On the platform P rests the magnetometer M (shown in plan in Fig. 2), which consists essentially of a system of magnets properly supported so as to be free to turn round a vertical axis, and shielded from currents of air by being enclosed in a quadrantal shaped box having a closely fitted glass cover. Each magnet is fully one centimetre in length, and is made of glass-hard steel wire of No. 18 B.W.G. Four of these magnets mounted in a frame with their poles turned in similar directions from the "needle" of the instrument. The frame carrying the magnets is made of two thin bars of aluminium placed side by side with their planes vertical and about a centimetre apart; and connected by a bridge of sheet aluminium. The ends of the magnets are fixed in holes in the vertical sides of the aluminium frame so that the four steel needles form a set of four horizontal parallel edges of a rectangular prism.